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BREEDING OF THE GOLDEN-CRESTED KINGLET (*REGULUS SATRAPA*) IN WORCESTER COUNTY, MASSACHUSETTS, WITH A DE- SCRIPTION OF ITS NEST AND EGGS.

BY WILLIAM BREWSTER.

DURING a visit to Winchendon, Worcester County, Massachusetts, in the latter part of June, 1887, I found, among other interesting things, a pair of Golden-crested Kinglets with young, the latter only a few days from the nest. They were in dense woods of mixed white pine (*P. strobus*) and spruce (*A. nigra*) on low, rather swampy ground. A careful search through several similar woods in the neighborhood failed to reveal any more birds of this species. Perhaps there were no others in 1887, for Mr. C. E. Bailey, who was my companion on that occasion, met with none either before or after my visit, although he spent most of the season collecting about Winchendon. Over the very same ground, however, in June, 1888, I found no less than six pairs of these Kinglets and, with the assistance of Messrs. C. E. Bailey, S. W. Denton, and H. M. Spelman, secured three of their nests, two with sets of nine eggs each.

As the published descriptions of the nesting of this species are somewhat meagre and more or less conflicting, it seems worth while to treat the present specimens at some length.

The first nest was found June 13, 1888, when the birds were

at work on the lining, the exterior being apparently completed, and was taken June 29, with a set of nine eggs, four perfectly fresh, the others slightly incubated. It was placed in a tall, slender spruce (*A. nigra*), on the south side, within about two feet of the top of the tree, and at least sixty feet above the ground, suspended among fine pendant twigs about two inches directly below a short horizontal branch, some twelve inches out from the main stem, and an equal distance from the end of the branch. The tree stood near the upper edge of a narrow strip of dry, rather open woods bordered on one side by a road, on the other by an extensive sphagnum swamp, the growth both in the swamp and along its edges being almost exclusively spruces (*A. nigra*) and balsams (*A. balsamifera*).

The nest measures externally: greatest depth, 3.60; least depth, 2.70; greatest diameter, 4.20; least diameter, 3.00 inches. Two measurements are required for each dimension because of the irregularity of the external outline. This although generally rounded is broken in places by deep depressions and prominent knobs or excrescences. The top of the nest is open, but the rim is slightly contracted or arched on every side over the deep hollow which contained the eggs. The extent of this contraction is best shown by the following measurements of the interior cavity: diameter at top, 1.15×1.95 inches; diameter midway between top and bottom, 1.40×2.10 . The cavity is oblong, not round. The walls vary in thickness from 1.35 to .40. Outwardly they are composed chiefly of green mosses* prettily diversified with grayish lichens and *Usnea*, the general tone of the coloring, however, matching closely that of the surrounding spruce foliage. The interior at the bottom is lined with exceedingly delicate strips of soft inner bark and fine black rootlets similar to, if not identical with, those which almost invariably form the lining of the nest of the Black-and-yellow Warbler. Near the top are rather numerous feathers of the Ruffed Grouse, Hermit Thrush, and Oven-bird, arranged with the points of the quills down, the tips rising to, or slightly above, the rim and arching inward over the cavity, forming a screen that partially concealed the eggs.

* These have been identified by a botanist as representing five species of *Hypnum* and one of *Frullania*.

The second nest was found June 16, when it was nearly completed, and taken June 29 with nine eggs, five of which were fresh, the remaining four being slightly incubated. The locality was a lonely glen on high land between two ridges. The ridges were covered with young white pines. The prevailing growth in the glen was spruce and hemlock, the trees of large size and standing so thickly together as to shut out nearly all sunlight from the ground beneath. The nest was on the west side of a sturdy, heavily limbed spruce (*A. nigra*) about fifty feet above the ground, twenty feet below the top of the tree, six feet out from the trunk, and two and a half feet from the end of the branch, in a dense cluster of stiff, radiating (not pendant) twigs, the top of the nest being only an inch below, but the whole structure slightly on one side of the branch from which its supports sprang. Above and on every side it was so perfectly concealed by the dense flake-like masses of spruce foliage that it was impossible to see it from any direction except by parting the surrounding twigs with the hand. From directly below, however, a small portion of the bottom was visible, even from the ground. The foliage immediately over the top was particularly dense, forming a canopy which must have been quite impervious to the sun's rays, and a fairly good protection from rain also. Beneath this canopy there was barely sufficient room for the birds to enter. In general shape and construction this nest closely resembles the one above described. It is, however, smaller, shallower, more compact, rounder, and less irregular in outline, measuring as follows: externally, greatest depth, 2.55; least depth, 2.45; greatest diameter, 4; least diameter, 2.90 inches; interior, diameter at rim, 1.70; diameter midway, 1.75; depth, 1.40; greatest thickness of walls, 1.60; least, .75. The materials composing the exterior are, similarly, green mosses and gray lichens, but the lichens are much more sparingly used. The lining, as far as can be seen without subjecting the nest to undue violence of handling, is wholly of the downy under feathers of the Ruffed Grouse. These are used so lavishly that, radiating inward from every side, they nearly fill the interior and almost perfectly conceal its contents.

The third nest was also in a spruce which stood near the top of a steep, picturesque hillside covered with noble old hemlocks interspersed with a few rather stunted spruces, the ground be-

neath rough and broken by ledges whose rugged outlines were more or less softened by a luxuriant covering of moss and rock ferns. The nest was on the south side of the tree about thirty feet above the ground, twelve feet out from the main stem, and five feet from the end of the branch. It was found June 17, when the bird was at work carrying into it what appeared to be the lining. We could not examine it closely without cutting off the branch, so it was left until June 29, when it proved to be empty, evidently deserted, and so dilapidated that at first we were inclined to believe it an old nest. This cannot have been the case, however, for the materials of which it is composed are quite new and fresh. These are essentially the same as in the other two nests, but there is no lining, although the outer edges of the rim as well as much of the upper portions of the exterior are covered with a profusion of feathers (chiefly those of the Ruffed Grouse with a few of the Red Crossbill) while others are merely entangled among the surrounding twigs. The probable explanation of this state of affairs is that the nest was first deserted, and shortly afterwards partially dismantled, either by the owners or by some mischievous squirrel or mouse. Originally, however, it must have had feathers over most of the exterior, for many of those now there are firmly attached to, or even woven into, the moss of which it is composed. This nest is larger than either of the others, measuring as follows: greatest external diameter, 4.00; least, 2.10; greatest depth, 3.90; least, 2.90 inches. The interior is too badly damaged to admit of accurate measurements.

To recapitulate. In position—but not of course in construction—the first nest resembles that of the Baltimore Oriole, being similarly hung near the ends of long, drooping twigs. The second is built more like a Vireo's, but with this difference, that instead of being suspended by its upper edges only, and between the forks of a single stem, it is supported on every side, and from the top nearly to the bottom, by numerous slender, but stiff, radiating twigs. It is, nevertheless, a distinctly pensile structure. The position of the third nest is different from that of either of the others. Placed nearly midway between two stout branches which in reality are forks of the same branch, one above the other, and at the point in question about six inches apart, it is attached by the sides and upper edges to the twigs which depend

from the branch above, while its bottom rests firmly on a bristling platform of stems which rise from the branch below. Thus it is at once pensive and non-pensive.

The eighteen eggs making up the two sets above-mentioned vary considerably in shape. The majority are more or less regularly ovate, but several are elliptical-ovate, while two are very nearly perfectly elliptical-oval. The ground color varies from creamy white to exceedingly deep, often somewhat muddy, cream color. Over this light ground are sprinkled numerous markings of pale wood-brown, while at least three specimens have a few spots and blotches of faint lavender. The brown markings vary in size from the finest possible dots to rather large blotches. In most of the specimens they are distributed pretty thickly over the entire shell, but in nearly all they are most numerous about the larger ends where they form a more or less distinct wreath pattern, while in four or five (and these have the lightest ground color) they are nearly confined to the larger ends, the remainder of the egg being very sparsely marked. Separating these eighteen eggs into the two sets to which they respectively belong, I find that these sets resemble each other very closely in every way, each having specimens representing all the variations above described excepting that all three of the eggs with lavender markings belong to the same set. In both sets the whitest, most sparsely spotted eggs were the freshest, showing that they were the last ones laid.

Lest the detail of the above description mislead the reader as to the general appearance of these eggs it may be well to add that while there can be no doubt that the markings are genuine pigment spots and not mere superficial stains (this has been doubted by some writers), they are, as a rule, so fine and so little darker than the ground color, that many of the eggs when viewed at a distance or in a poor light appear brownish cream color and immaculate. The eggs just described measure respectively: (Set A—9) .56 × .44, .57 × .44, .55 × .42, .57 × .43, .57 × .44, .57 × .44, .56 × .45, .57 × .44, .57 × .44 inches. (Set B—9) .56 × .44, .56 × .45, .52 × .42, .59 × .45, .57 × .45, .53 × .43, .57 × .45, .56 × .44, .54 × .44 inches.

In both nests the eggs, too numerous to find sufficient space for their accommodation on the bottom of the nest, were piled in two layers, one above the other. In the first nest the relative

number of eggs in the two layers was not noted. In the second there were five eggs in the lower and four in the upper layer.

All these nests were found by watching the birds while building, a task of no slight difficulty in dense spruce woods where the light was dim, even at noonday, and mosquitoes were so numerous as to make it torture to remain still for any considerable length of time. Moreover, the movements of the little architect were erratic and puzzling to the last degree. One moment fluttering at the end of a branch, her bill filled with a mass of building material, or tugging at the loose end of a shred of bark or moss, the next hidden from sight among the dense spruce foliage, now flitting rapidly from tree to tree, again dashing back and forth between two adjoining trees, the female would often appear and disappear a dozen times and at as many different places in the course of a minute or two. The chief difficulty, of course, was to make out just when and where she deposited her burden, which often vanished in the most unaccountable way. We finally found that her almost invariable custom was to approach the nest by short flights and devious courses, and upon reaching it dash in, deposit and arrange her load in from *two to four seconds*, and at once dart off in search of more. When it is considered that the nest, even at a distance of only a few yards, was indistinguishable from hundreds of dark clusters in its own and neighboring trees, and that the bird during her flights to and from it often entered and remained quite as long within several of these clusters as in the nest itself, the difficulties of the case will be better understood. As a matter of fact we did not in a single instance settle the exact position of the prize until we had watched the birds for several hours and spent much fruitless time in climbing to the deceptive clusters already mentioned.

In her flights after building material the female sometimes went a distance of a hundred yards or more, but oftener she confined her quest to the trees within a radius of fifty yards or less of the one which concealed the nest. She was invariably followed closely by the male who, however, did not assist her in any way other than by singing almost incessantly, in an undertone. In the case of the three nests which we took, and a fourth which we must have been very near to but did not find, the males in every instance first attracted us to the spot where their mates were at work by this peculiar, subdued song. It was often

repeated almost incessantly dozens of times in succession. Should it prove to be, as seems probable, an invariable and characteristic accompaniment to the operation of nest-building its value as a clue to the neighborhood of the nest and the presence of the female is worth bearing in mind. Besides the song* both birds uttered frequently a low *ti, ti, ti* which seemed to serve as a call to indicate one another's presence or position.

In each instance the sitting female left her eggs as soon as the movements of the climber began to shake the tree, but when he neared the nest she with her mate showed the utmost anxiety and boldness, approaching within a few feet of his head and uttering the *tzee-tzee-tzee* note incessantly.

To conclude, the nests above described are, I believe, the first that have ever been taken in Massachusetts, although my finding the brood of young birds at Winchendon in 1887 was, of course, prior and equally conclusive proof that the species breeds within our limits. That it breeds regularly at Winchendon is highly probable, but, as already stated, there are reasons for doubting that it is always as common there as it was in 1888. About July 1 of this latter year, it was discovered by Mr. Faxon in considerable numbers, and unquestionably breeding, on the northern side of Mt. Graylock in Berkshire County where I searched for it vainly in 1885 although, to be sure, I did not visit the particular part of that mountain where it has since been found. Hence my failure to meet with it affords no proof of its absence or even rarity there in 1885. Nevertheless I cannot help thinking that the number of birds which nested the past season in both Berkshire and Worcester Counties may have been exceptional.

Another point worth considering is the approximate date at which this Kinglet may be assumed to nest. The fact that the nest found by Mr. Minot† among the White Mountains of New Hampshire in 1876 contained young as late as July 16, taken in connection with my observations in 1888, would seem to indicate that the bird is a late breeder and that somewhere between

* This begins with a succession of five or six fine, shrill, high-pitched, somewhat faltering notes and ends with a short, rapid, rather explosive warble. The opening notes are given in a rising key but the song falls rapidly at the end. The whole may be expressed as follows: *tzee, tzee, tzee, tzee, ti, ti, ter-ti-ti-ti-ti*.

† Land and Game Birds of New England, p. 56.

June 10 and 17 would be the best time to find the female building (it would be next to useless to search for the nests after they are completed), while June 25 to July 1 should be early enough to expect full sets of eggs. But opposed to this conclusion are the early date (June 26) at which I found young on wing near Winchendon in 1887 and the record * by Mr. Charles H. Andros of a set of ten eggs taken by Mr. Cheney at Grand Manan, New Brunswick, "on or about June 1." It is possible that the species rears two broods in a season but, on the whole, I am inclined to believe that its time of nesting is irregular, varying at different places or at the same place in different years.

BIRDS OF CARROLL COUNTY, INDIANA.

BY BARTON W. EVERMANN.

CARROLL COUNTY lies in the northern central part of Indiana, about one hundred miles south of Lake Michigan. The chief river of the County is the Wabash, which flows southwest across the northwest part of the County. The greater part of the County lies to the east and southeast of the river, and is drained into it by Rock, Deer, and Wild Cat Creeks. The Tippecanoe River flows for a few miles through the northwest corner of the County, its direction being almost due south.

All that portion of the County lying to the east and southeast of the Wabash (embracing ten of the thirteen townships) was originally very heavily timbered, and there yet remain many uncleared acres. The chief forest trees are beech, red and white oak, elm, ash, poplar (tulip), sycamore, maple (hard and soft), walnut (black and white), hickory, — in short the usual deciduous trees of the ordinary forest of central Indiana. There are practically no pines or other evergreens in the County, except a very few along the Tippecanoe. The three townships lying on the right bank of the Wabash differ materially from those on the other side. Adams, the most eastern of the three, is inclined to

* Ornithologist and Oölogist, Vol. 12, p. 203.